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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manal dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

CASE COVERER (jewelry cases; leather prod.) 6-62.401
LINER (jewelry cases; leather prod.) 6-62.402

B-440 or S-174

TM 001 605

U. S. Employment Service in
Cooperation with
Wisconsin State Employment Service

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.

October 1961

GATB #2288
April 1960

CASE COVERER 6-62.401
LINER 6-62.402

B-440 or S-174

Summary

The General Aptitude Test Battery, B-1002A, was administered to 50 women applicants who were later employed as Case Coverers 6-62.401 and Liners 6-62.402 at the Beaver Specialties, Incorporated, Beaver Dam, Wisconsin. The criterion consisted of broad category supervisory ratings. On the basis of mean scores, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes S-Spatial Aptitude, K-Motor Coordination, F-Finger Dexterity, and M-Manual Dexterity were selected for inclusion in the test norms.

GATB Norms for Case Coverer 6-62.401 and Liner 6-62.402 - B-440 or S-174

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Case Coverer 6-62.401 and Liner 6-62.402.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-440 or S-174

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
S	CB-1-F CB-1-H	85	S	Part 3	80
T	CB-1-G CB-1-K	85	K	Part 8	90
F	CB-1-O CB-1-P	95	F	Part 11 Part 12	90
M	CB-1-M CB-1-N	100	M	Part 9 Part 10	95

Effectiveness of Norms

The data in Table V indicate that 15 of the 17 poor workers, or 88 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 88 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 27 of the 29 workers who made qualifying test scores, or 93 percent, were good workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupations of Case Coverer 6-62.401 and Liner 6-62.402.

II. Sample

The GATB, B-1002A, was administered during the period of August 1956 through December 1959 to 50 women applicants who were later employed as Case Coverers 6-62.401 and Liners 6-62.402 at the Beaver Specialties, Incorporated, Beaver Dam, Wisconsin. The workers in the two occupations performed interchangeably on both jobs and one foreman supervised their work. Training time for both occupations is from 3 to 6 weeks with four weeks considered average. All workers in the experimental sample had at least one month of experience.

Applicants were referred to the company by the Wisconsin State Employment Service. There were no education or experience requirements for the jobs. The selection of applicants was made on the basis of the company requirements, previous work experience, if any, and a check of references. Applicants were selected without regard to tests results.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations (corrected for broad categories) with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_{c}r$) for Age, Education, and Experience

Case Coverer 6-62.401
Liner 6-62.402

N = 50

	M	o	Range	$_{c}r$
Age (years)	32.9	9.6	19-49	.267
Education (years)	10.7	1.7	6-13	-.126
Experience (months)	14.9	10.8	1-35	.663**

**Significant at the .01 level

There are no significant correlations between age or education and the criterion. The correlation between experience and the criterion is significant at the .01 level. This appears to be a genuine relationship because many of the workers who lacked the ability to perform the duties of the jobs successfully were either transferred to unskilled jobs or discharged after being on the job for a month or two. The data in Table II indicate that this sample is suitable for test development purposes with respect to age, education and experience.

III. Job Description

Job Title: Case Coverer 6-62.401

Job Summary: Covers the outside of cabinets, such as table radio cabinets and combination radio-record player cabinets, with pyroxylin material. Positions precut, preglued pyroxylin strips by hand on side, top and bottom cover boards of cabinet. Smooths wrinkles in material using a damp cloth. Removes wrinkles by pulling strips off to the wrinkled area and repositioning strips onto board. Trims away excess material with scissors and smooths material over corners and edges with hands and fingers. Rubs covered areas with wooden hand tool to force glued material to adhere to wooden surface. Places cloth material over front section of some cabinets, and forces material into grooves with a groover. Fits cloth around holes and curves by cutting it with scissors and knife. Carries covered cabinet to next work station.

Job Title: Liner 6-62.402

Job Summary: Lines the inside cover and box of table model radios and combination radio and record players with texture paper and pyroxylin strips. Applies glue to precut texture paper and pyroxylin by running them through an electrically powered gluing machine. Positions by hand glued pyroxylin strips in sequence on top and sides of inside cover. Cuts into material near corners with scissors and fits material in the corners, smoothing out surface with the fingers. Smooths out wrinkles by pulling off strips to the wrinkled area and repositioning lining onto cover. Rubs inside corners and sides of lining with flat-surfaced wooden tool to force material to adhere to cabinet. Positions precut texture paper over inside cover to complete lining operation.

IV. Experimental Battery

All tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of broad category ratings made by the foreman in charge of the workers. Ratings were made on March 5, 1957; August 29, 1957; March 18, 1959; October 23, 1959; March 29, 1960 and April 19, 1960. All the workers were rated two to four times. Because of the comparability of jobs, ratings were made on a broad

category basis. Averaging the ratings for each worker resulted in seven broad category groups. Numerical criterion scores were computed for these seven groups. Group A with 10 workers received a score of 64; Group B with three workers - 57; Group C with four workers - 55; Group D with 16 workers - 50; Group E with four workers - 45; Group F with three workers - 43; and Group G with 10 workers - 36.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Form Perception (P) - required to properly position materials, cut off excess material and to smooth material over edges and corners. Also required to cut materials over holes and slots into sections and to fit smoothly over edges.

Motor Coordination (K) - required to position materials accurately on radio and/or radio-record player cabinets, to cut materials at corners and to trim off excess materials.

Finger Dexterity (F) and Manual Dexterity (M) - required to pick up and position materials, smooth wrinkles and pull and reposition strips onto board. Also required to use hand tools to force glued materials to adhere to wooden surfaces.

On the basis of the job analysis data, Aptitudes V, N, and Q were considered obviously unimportant for performing the duties of this job and were rated as "irrelevant" aptitudes.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations (corrected for broad categories) with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general working population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_cr$) for the Aptitudes of the GATB

N = 50

Aptitudes	M	σ	$_cr$
G-Intelligence	94.3	13.6	.155
V-Verbal Aptitude	95.4	13.6	.132
N-Numerical Aptitude	97.4	15.4	.123
S-Spatial Aptitude	96.0	14.2	.299*
P-Form Perception	104.5	14.8	.179
Q-Clerical Perception	102.7	14.4	.121
K-Motor Coordination	105.1	14.9	.267
F-Finger Dexterity	103.2	19.2	.624**
M-Manual Dexterity	110.0	18.5	.495**

**Significant at the .01 level
*Significant at the .05 level

Aptitudes P, K, and M have the highest mean scores and Aptitudes G, V, S, and Q have relatively low standard deviations. For a sample of 50 cases, correlations of .354 and .273 are significant at the .01 level and the .05 level of confidence, respectively. Aptitudes F and M correlate significantly with the criterion at the .01 level. Aptitude S correlates significantly with the criterion at the .05 level.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important					X		X	X	X
Irrelevant		X	X			X			
Relatively High Mean					X		X		X
Relatively Low Sigma	X	X		X		X			
Significant Correlation with Criterion				X				X	X
Aptitudes to be Considered for Trial Norms 6				S	P		K	F	M

Trial norms consisting of various combinations of three and four of Aptitudes S, P, K, F, and M with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of S-80, K-90, F-90, and M-95 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A criterion critical score of 50 was used and resulted in 17 of the workers, or 34 percent of the sample, being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes S, K, F, and M with critical scores of 80, 90, 90 and 95 respectively, and the dichotomized criterion for Case Coverer 6-62.401 and Liner 6-62.402. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for S-80, K-90, F-90, M-95

Case Coverer 6-62.401
Liner 6-62.402

N = 50

	Non Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	27	33
Poor Workers	15	2	17
Total	21	29	50

$r_{tet} = .90$ $\quad X^2 = 19.819$

$\sigma_{r_{tet}} = .23$ $\quad P/2 = < .0005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes S, K, F, and M with minimum scores of 80, 90, 90, and 95 respectively, have been established as B-1002 norms for the occupations of Case Coverer 6-62.401 and Liner 6-62.402. The equivalent B-1001 norms consist of S-85, T-85, F-95 and M-100.

IX. Determination of Occupational Aptitude Pattern

A significant relationship between OAP-27 and the criterion for the experimental sample was obtained. The proportion of the sample screened out by OAP-27 was .26, which is within the required range of .10 to .60. Therefore, the occupation of Case Coverer 6-62.401 and Liner 6-62.402 will be allocated to OAP-27.